Learning in and for Participation in Work and Society[1]

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This paper is intended to contribute to the development of a framework for research that can guide the design of learning resources in work and society. The broad subject of our work is adult learning, and we have chosen to focus on learning in the setting that occupies about half of the waking hours of many adults—the workplace. An interdisciplinary seminar at the Institute for Research on Learning has been integrating the findings of a number of researchers engaged in empirical work on how learning actually happens in the workplace. We have identified several themes that should be explored for their ramifications for policy, practice, and further research, and that have important implications for understanding learning in all settings, not just in the workplace.

The corporate world's overwhelming reliance on classroom training reflects a common view of learning as separate from, and preparatory for, work. It also reflects a preoccupation with the development of individual skills and with the individual's acquisition of knowledge and information. This traditional, purely cognitive, view of learning—the view that is firmly embedded in our education and training systems—focuses on knowledge as structured information, and learning as the accumulation of information. It also views motivation as external to learning, and as simply disposing individuals to do the otherwise dry work of accumulation. The fact that many teaching and assessment practices embody this view of learning tends to enforce the view further, making it appear as the natural way to do things. We argue the contrary: learning is fundamental to, and a natural part of, human activity; it is the classroom situation that is anomalous. If we want to understand learning, we must come to understand what, when, and why people learn under normal circumstances, not just when they are thrown into classroom situations to learn under duress.

The separation of learning from activity and from the motivation to learn is also something we challenge. It has come about, we believe, as part of a separation of the social from the cognitive—an abstraction of the individual from the activities and collectivities that define human existence. While this separation may facilitate some scientific activities, it should be recognized as a "convenient fiction," and not be taken as basic to human behavior. We take the

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view that activity, motivation, and learning are separable only in a very normative (even punitive) view of learning, and that a theory of learning that ignores these connections cannot account for when, how, or what people learn. This view has many implications for research and for action, and is confirmed by a large body of empirical work on learning as it happens in everyday activity.

Learning to Become

Underlying this paper is the understanding that people learn in order to achieve desired forms of participation in communities and activity, in order to affect positively their sense of their meaning in the world. People learn not just in order to do, but in order to become. Thus learning is embedded in communities and inseparable from identity. The fundamental argument of this paper will be that the most critical development of work expertise takes place not in training sessions, but on the job in meaningful work activities. In our focus on meaning, we stress the learners' sense that they are contributing to the life and success of an enterprise that matters to them and to others, and that they in turn matter to that enterprise. A worker engaged in mindless or meaningless activity learns a good deal—about meaninglessness.

This view of learning has been put forth in Jean Lave and Etienne Wenger's work on communities of practice (Lave and Wenger 1991, Wenger 1998), locating learning and the construction of knowledge in communities of practice, as inseparable from practical action, and inseparable from the life of the community. Most importantly, this view links individuals to communities, and links the cognitive to the social.

A community of practice is an aggregation of people who, through joint engagement in some enterprise, come to develop and share ways of doing things, ways of talking, beliefs, values—in short, practices. In many cases it is easy to identify the common endeavor that assembles a community of practice: a garage band, an engineering team, a day care cooperative, a research group, a kindergarten class. But that endeavor develops a life of its own as local practices develop, transforming the relations, activity, and perhaps the enterprise itself. An overworked secretarial pool can become a bastion of resistance, a friendship group can become a garage band, a Lamaze class can become a friendship group. Communities of practice emerge and develop in order to fulfill common needs—and in response to a shared environment. A gang may emerge in response to a shared sense of threat in the urban environment, and it may transform itself into a community help organization if local authorities find meaningful ways to support its participation in legal rather than illegal activity.

Because we are focusing on the workplace, we will focus on the kinds of community of practice that tend to emerge in workplaces. Such communities may emerge in response to the formal structure of an organization, whether in order to find a productive way of accomplishing a task, to find a way to work around an unworkable structure, or to provide mutual support in the face of demeaning or unfair treatment. The success of an organization may well be measurable in terms of the extent to which the communities of practice that emerge within it are aligned with the organization's structure and purpose.

Engagement in a joint endeavor involves the construction of individual and community knowledge, both around activity and around the construction of a joint sense of the community in relation to the broader social landscape. Community knowledge involves whatever it takes to participate effectively in the community—it involves not only facts and skills, but also knowledge of social relations and practices. Community knowledge will also involve a joint view of the larger social and organizational landscape, and such things as the community's relation to, and attitudes towards it. Thus within a workplace, a community of practice will come to define itself both in terms of its internal functioning, and in relation to other aggregations in the workplace. Kinds of knowledge and expertise become part of what constitutes the community on the one hand, and what distinguishes individuals and their forms of participation in the community on the other. Thus individuality and community cannot be defined independently of each other. Participating in the community requires knowledge of community practice, and involves an ongoing participation in the construction of new knowledge. Newcomers to a community of practice must enter into this knowledge practice in order to participate: they must learn in order to participate, and they must have access to participation in order to learn. Barriers to learning in the workplace, therefore, are to be sought in people's access to knowledge and practice within communities of practice, and in the relation between the community and the larger organizational and social landscape.

Individuals participate in a variety of communities of practice, and the forms that their participation take in their various communities of practice may be quite different—in some cases they may participate quite marginally, while they may be central in others. Some will be relatively transitory, or unimportant, while their participation in others may be a central part of their lives. The individual's identity emerges in the process of articulation and resolution of participation in all of these communities of practice, and the identity of each community of practice emerges through its participants' joint engagement in this process. People learn in order to be able to participate, to contribute, to see their effect, to become particular kinds of people with particular capabilities. Learning, therefore, is part of a personal trajectory, but a trajectory that is defined in relation to others and to joint practice with others. The motivation may be simply to be better than someone else, or to avoid humiliation, but it may also be to cooperate with someone, to achieve a formal status, to help someone, to make something happen, or to get something done.

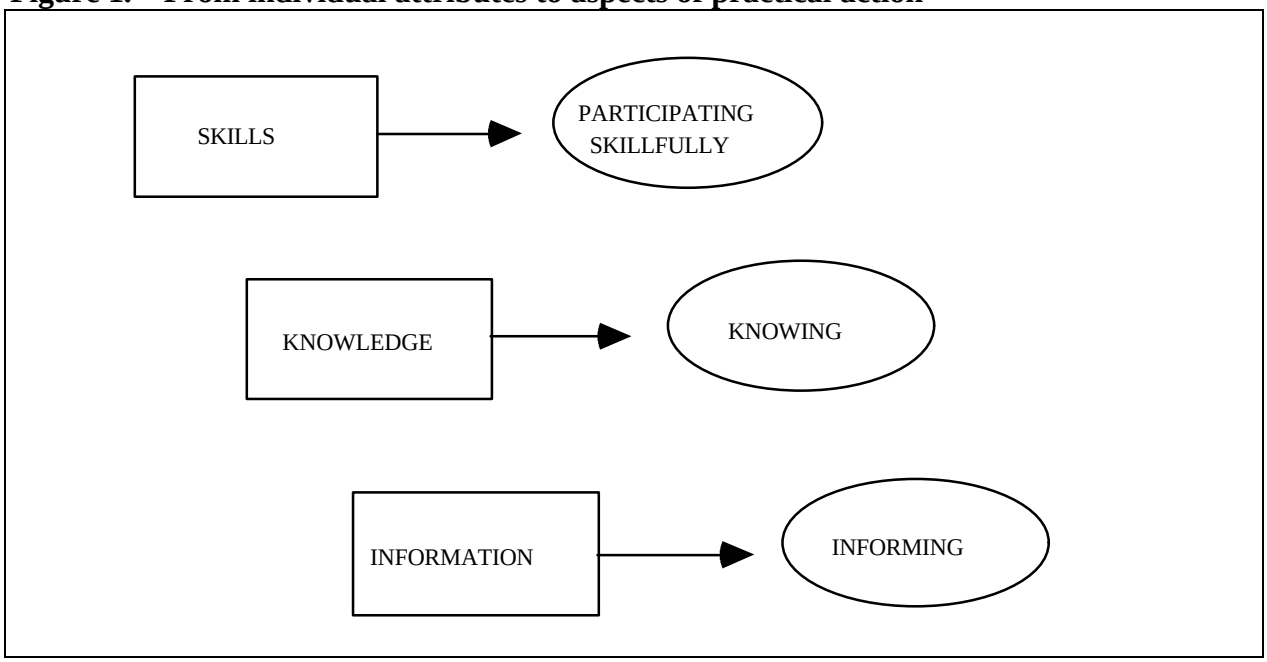
Studies of learning at work show over and over again that the formal organization of workplaces can stymie workers' attempts to make their work meaningful. Much work today is still based on the segmentation of functions and tasks and as a result inhibits a broader understanding of the overall organization and how one fits into it. People can contribute to the success of an organization in different ways, and an important aspect of an individual's sense of meaning and significance comes from being able to recognize and appreciate the way that her or his activity contributes to the larger system of activity in the organization.

To understand how individuals participate successfully in learning in their work and social lives, it is essential to consider the conditions in which they have opportunities to learn. Activity involves the articulation of an individual's work with that of other people with whom that individual interacts, and with the resources that they have available, such as computers, documents, systems for keeping records, physical machines, and the business functions to be accomplished. Many studies have also shown that success in learning depends on social arrangements that determine how hard or easy it is for different people to participate meaningfully in aspects of activity that

matter (e.g., Lave & Wenger 1991; Reder & Schwab 1988; Sachs 1995; Scribner and Sachs 1990, 1991; and Wenger 1998).

The findings of research studies on learning provide an understanding of activities that are successful or unsuccessful in different ways. It is clear from many analyses that success or failure in practical activity cannot be understood only in terms of the knowledge, skills, and information that are brought to the situation by individuals. These individual attributes must be considered in relation to the social arrangements and other resources with which the individuals interact. To emphasize this, it is useful to revise some of the terms that we use to analyze and evaluate programs and resources for learning. Some of the main analytical terms of these discussions are in figure 1, in which we propose replacing static terms that are the common learning vocabulary with terms that acknowledge the embedding of learning in action, belonging, and interpreting.

Figure 1.—From individual attributes to aspects of practical action



Learning, in these terms, takes place when cognitive and social interactions naturally intertwine, as they do in activities (Scribner 1984). When "thinking" isn't just "in the head" but is taking place in the context of getting something done (as it usually is), "know what"—or accumulating facts—becomes meaningful because people are also learning "know how," "know why," and "know when" (Scribner 1984; Scribner & Sachs 1990, 1991). Learning involves becoming more successful in sustained participation in the practices of work, citizenship, family, and social life. It includes improvements in knowing how to perform actions that are parts of social practices; understanding the concepts and principles that groups use in planning, doing, evaluating, and explaining what they do; finding out who is knowledgeable about what and knowing how to

interact productively with them; and informing activities by finding, interpreting, and using documents, data bases, and other sources of information. The human, physical, and organizational

resources that support people's becoming more effective in these forms of participation constitute their learning environments.

Learning occurs everywhere in social activity, so to understand and improve learning in an organization or society, it is essential to understand how its learning environments work and how they can be changed productively. The development of policies and programs for learning involves the addition or reallocation of resources in a society's learning environments, with the intention of helping people learn more successfully. However, given the complexity of these environments, changes conceived in abstraction from the communities of practice that they are intended to serve run the risk of being counterproductive. It cannot be assumed that some new program will necessarily improve the overall level of learning in an organization or society; the program will interact with other resources and constraints in the system in ways that will be surprising, and may even turn out to be harmful rather than beneficial. Understanding how learning takes place in these complex environments, therefore, is crucial for effective change.

Some Critical Features of Adult Learning in Complex Environments

Four themes have come up over and over again in empirical studies of people learning in workplaces, which have an important influence on people's success in learning in these environments. Each of these will have important ramifications for policy, practice, and further research that need to be explored by the relevant professional communities. We will organize the rest of our discussion around these issues:

- the existence of multiple perspectives;
- the need for access to what matters;
- the ubiquity of knowledge work; and
- the social construction and maintenance of knowledge.

Multiple Perspectives

- Skillful participation, knowing, and informing are embedded in practices, which vary among communities of practice within an organization.
- However, organizations often recognize only a single "official" perspective as legitimate.
- Communication across perspectives can be a crucial work function.
- Designing learning environments from a limited perspective can be counterproductive.

Communities of practice within a single organization may have quite distinct practices. They will engage in specific activities and attend to specific kinds of knowledge and expertise as a function of their enterprise, and they may have very different social structures (e.g., some may be hierarchical, others egalitarian), different ways of interacting among themselves (e.g., some may be casual, others formal), different ways of sharing information (e.g., some may use memos, others casual conversations; some may share information openly, others may emphasize specialization; some may encourage all participants to volunteer knowledge, others may have hierarchical knowledge practices). Skillful contribution to any community, therefore, requires a wide range of capabilities—knowing facts, concepts, and principles; understanding social relations and norms of interaction; knowing how to communicate and how to interpret documents and other information sources; and learning these practices and perspectives is crucial for a newcomer who wishes to participate in, and contribute to, a community of practice. Ongoing participation also involves continual learning as the community of practice changes, and as individuals change their own forms of participation.

In addition, each community of practice will have its own window on the larger enterprise of which it is part, hence its own perspective on the activities, functions, and values of the organization, and on its own place in it. Communities of practice that form around the accomplishment of some piece of the organization's work are likely to develop their own perspective on that work, their own theories of what it is for, why it matters, and their own day-to-day way of accomplishing the work. People's abilities to learn, whether in schools, workplaces, or other social settings, depend on conditions that support their belief in their own emerging perspectives, and hence their ability to build on them. People also need to understand the relation between their own perspectives and the other perspectives of the enterprise, especially if there is a predominant legitimized perspective (as there usually is). When the perspectives of separate communities of practice come into contact, and one community has authority over the other in some form (such as through hierarchical structure or having control over the budget supporting a strong business initiative) then barriers to understanding the other's perspective tend to grow rather than recede. In an organization, this introduces significant challenges to getting work done effectively. Indeed, evidence demonstrates that complex work
settings demand a wide range of "know-how" in order to put plans into action, and to the extent that a single authoritative view precludes effective cross-functional coordination, not only is productive work impeded, but it is impeded because workers are denied access to understanding the multiple perspectives that are required to get the job done. This translates into a learning inhibitor (e.g., Scribner & Sachs 1990).

Recognizing different perspectives, whether organizationally legitimized, personal, or that of another community, is an important capability for people to have in order to achieve success. In fact, knowing how to deal with multiple perspectives in constructive ways may be as important as mastering specific skills within a given perspective. Barley (1996), analyzing several varieties of works labeled as "technician," found that the ability to communicate across multiple perspectives in a work organization was crucial to their work. It was this ability that enabled them to be effective in providing service and helping users of technological systems understand how to utilize the systems effectively and without causing breakdowns.

These findings, and others that are consistent with them, imply that there are opportunities for improving the design of work by gaining understanding of the perspectives of people who do the

work. Two approaches have been developed to accomplish this. One is participatory design, in which people who do the work are included in the process of designing resources and social arrangements for the activity. Another is thorough ethnographic study of the work activity, to identify important characteristics of the work in its settings. By combining these into an "interactive research and design" process, it is possible to develop learning strategies that can introduce new practices and enable more comprehensive learning in less time than in traditional training (Whalen and Whalen 1997).

Access to What Matters

- Apparently unskilled performance can be caused by lack of access to functionally important processes and information.
- Access to these processes and information can benefit productivity and learning.
- Learning can be enhanced when work teams monitor and design their own work processes, and gain access to the practice in which these processes are embedded.

Being skillful and knowledgeable in a social system depends on having access to aspects of activity that matter in the successful functioning of an organization, community, or society. Lack of access to significant processes and information prevents participants from appreciating the significance of their contributions, and harms both their satisfaction and their effectiveness. In an example studied by Wenger (1998), an insurance company organized the work of claims processors in such a way that they computed an allowable claim by simply entering data into a form. Nonetheless, it was still their responsibility to handle telephone calls from clients inquiring about their claims, and because the computation functioned as a black box, newcomers were unable to give adequate explanations of claim actions. In another negative example, studied by Suchman and her colleagues (1998), a group of workers in a law firm had the responsibility of coding documents to select those that were relevant to cases that were being prepared. Although the attorneys assumed that document coders did not need access to the general legal or strategic issues of the case, empirical study showed that the document coders inferred significant aspects of these issues, which they needed to understand in order to make their selections successfully.

In contrast, Adler (1993) found a positive example in his study of activities of assembly line workers in an automobile plant. The workers were organized in teams, and the work of the teams included analyzing their operational productivity and efficiency. This analytical function has traditionally been in the purview of engineers, who have given workers directions intended to improve their productivity. Giving workers access to this function of analysis and work design yielded greater productivity and much greater satisfaction with their work. It is important to analyze what functions are actually significant for participants to spend their time on: not all functions "matter." Adler and Cole (1993) noted that in another plant, where work teams focused attention on more general issues such as formulating goals and philosophies of production, this kind of reflection did not enhance their productivity.

Another positive example, from Hutchins's (1995) analysis of navigation work on navy vessels, involved teamwork in which junior members of the team could observe the ways in which their more senior officers handled information. This legitimate peripheral participation (Lave and Wenger 1991) provided opportunities to learn the patterns of activity that they would need to participate in when they were promoted. The common compartmentalization of functions can prohibit just this kind of access. In a case cited by Lave and Wenger (1991), apprentice meatcutters operated machines that wrapped cut-up meat in plastic, separate from the room in which the operations of cutting meat were carried out. As a result, they were unable to learn anything but the immediate skills, deprived of access to the defining activity of the workplace.

These examples suggest that redesigning work and the work environment to provide meaningful access to what matters in a social system has important beneficial effects, supporting more engaged, knowledgeable, and skillful participation which complement the effects of programs designed to strengthen workers' "basic skills." A proactive case from a large telecommunications company demonstrated that the participatory design of work by the workers themselves and a team of social scientists produced an effective design of a work system. The design was based on expanding access to the work of others in multiple occupations—and in turn learning about their work—and had the effect of producing greater meaning in the work as well as increasing market share (Corcoran 1992, Sachs 1995). In other words, increasing access to learning and broadening access across multiple perspectives not only enhanced the learning of individuals but also was productive for the organization along many dimensions.

More broadly, we expect that people's engaged, knowledgeable, and skillful participation in their activities as members of society depends on their access to participation in what matters in the society, and that the design of programs for adult learning would benefit from analyses of the relations between participation structures of social institutions and people's orientations toward interactions in those institutions (Eckert 1989). In citizenship activity, programs that encourage and support people in identifying problems that matter to them, for example, problems involving neighborhood resources, can provide powerful occasions for their learning (Stein 1998).

The Ubiquity of Knowledge Work

- **Labeling a subset of jobs as involving "knowledge work" is unjustified:** Intellectual processes, such as reasoning, understanding, and flexible problem solving are required in "low-skill" jobs and craft work.
- **Considering "basic skills" as separate factors to be "trained" and "tested" is inaccurate:** Skilled participation requires interpreting information sources, reasoning, and interacting people in problem situations as they emerge.

In empirical research on learning in work, one general finding is that all jobs have significant intellectual requirements. The distinctions often made between "knowledge work" and "routine work" are much too sharp to reflect the distribution of requirements for reasoning, problem solving, and judgment that are found when actual work is analyzed (e.g., Orr 1997, Suchman, 1995). Studies of work practice show that "knowledge work" is far more widespread than

suggested in the literature on knowledge work or knowledge management. There are demonstrations of intellectual work in a wide range of jobs not generally viewed as involving knowledge work. The place to look for knowledge work is where workers actively make sense of their environment and their activities. This can be as simple as interpreting a corporate memo over coffee or figuring out how to put into practice a new business process. Just as the managerial view of the organization is the "legitimate" view, marginalizing the view of more powerless communities of practice, so the definition of "knowledge work" seems to be defined in terms of whose knowledge it is.

In analyzing the characteristics of successful work activity, it is more useful to think of "knowing," rather than "knowledge." This reflects the active nature of what people actually do when they understand situations and communicate and collaborate with others in solving problems and making decisions. Cook and Brown (1995) state that craft is a kind of knowledge work by examining ways in which expert knowing in craft work is embedded in practices that workers develop and learn through participation. In a study of workers in high-performance electronics manufacturing, Hull (1997) identified requirements for understanding, reasoning, and improvising that were not acknowledged in the official job descriptions. Scribner and Sachs (1990) obtained similar findings in their studies of inventory management workers. In the same way, in his research on technicians cited above, Barley (1996) recognized the importance of bridging perspectives to the success of technicians' jobs because they need to communicate with different kinds of people using their systems. But this understanding was not recognized as part of the job requirements.

An assumption in many discussions is that success in work activities depends mainly on skills that can be acquired by individuals prior to their employment, given appropriate levels of motivation, individual potential for learning, and training. Analyses of work activity show that success usually depends on generative abilities to understand situations and solve problems that emerge in activity. An example, from Linde and her colleagues' study of interactions in insurance agents' offices (Darrouzet et al. 1996), involves numerical reasoning. Agents and members of their staffs engage in conversations involving complex quantitative reasoning as they construct their understanding of the customers' needs and the features of available insurance products. The ability to reason and communicate successfully in these interactions involves a form of "numeracy" that is generative in social interaction and is fundamentally different from the kinds of mathematical skill that are measured in tests of school mathematics achievement.

There is much evidence that the capabilities that workers utilize when they are successful involve understanding and solving problems that emerge in their activities. This implies that programs that simply train "basic" skills that are abstracted from work situations are likely to be less effective than programs in which workers strengthen their more generative abilities. Hull (1997) found that assembly workers acted skillfully regarding texts and representations of quantitative information, but that their success depended on understanding situations in which literacy, numeracy, and other domains of skill are fundamentally interactive. Thus learning procedures in contexts that are separated from the interactional settings of work can be relatively ineffective. Instruction that emphasizes understanding of situations and learning to apply methods can have considerable generality (e.g., Boaler 1997, Brown & Kane 1988). For learning that relates to specific jobs, it can be much more effective to provide learning experiences that are tightly phased with time on the job. An example involving studies of learning and work in telephone service is a pattern of learning, called Phased Interactive Learning (PHIL), in which classroom activities are interphased

with work on the job and workers with different experience are placed in learning groups to benefit from each other's experience (Whalen & Whalen 1997).

The Social Construction and Maintenance of Knowledge

- In organizations, "knowledge" has a political function.
- All work involves specialized knowledge, but only certain work has enhanced status because it is understood to require specialized "knowledge."

We propose using the term "knowing" to refer to the abilities of people to contribute effectively and productively to activities. The term "knowledge" is used in social systems to designate collections of information, concepts, and principles that are recognized in the group. By identifying some aspects of knowing as "knowledge," the group supports distinctions between members of the group who have that knowledge and members of the group who do not. Groups also differentiate their members according to who of them need certain collections of the information, concepts, and principles that they recognize as knowledge.

One should not expect knowledge to be distributed uniformly within an organization, community, or society. Indeed, social systems make important distinctions among their members according to the knowledge they are recognized as having. This involves discrepancies between the ubiquitous form of implicit knowledge work (knowing) and the organization's *legitimized* knowledge and knowledge work. These differences are often associated with specific training or credentials obtained in educational institutions. In Suchman's (1998) study of legal document processing, a strict distinction was drawn between the knowledge required to screen documents for relevance to a case, and the understanding of important aspects of legal and strategic aspects of the case, assumed to be the purview of the trained attorneys.

The relation of people to information technology can embody this distinction, particularly as evidenced in the design of expert systems. These systems, commonly viewed as repositories of rarified expert knowledge, are configured with a view to supplementing the knowledge of their users—putting "pure" information at their disposal. Whalen and Vinkhuyzen (in press) studied just such a system designed for call service representatives in a company that sells and services technologically complex machines. This "expert-system" computer program provided scripts for representatives interacting with customers calling to request service. Designed from the engineers' perspective, the computer system prescribed questions for the representatives to ask customers in order to elicit information relevant to diagnosing why the customer's machine was malfunctioning. From the representatives' perspective, the questions often required them to violate important conversational conventions, especially with regard to presuppositions about the customers' competence, which could be crucial to a successful interaction. This is a perfect example, not only of the compartmentalization of legitimized knowledge, but of the powerful consequences of multiple perspectives on the work of an organization—the engineers' perspective included no understanding of the situations in which the knowledge they were embedding in the system would be used. Use of the system as it was designed was counterproductive, and successful representatives had to devise work around in order to succeed in their work. The engineers who designed this system assumed that knowledge about the machines that customers

were complaining about could be incorporated in artificial intelligence, so that the workers would not need to be trained to understand the machines. What is missing in this picture is the kind of knowledge required to put information to work—for inscriptions to become information they have to be interpreted, a process that occurs in activity in ways that are embedded in social practices. Designs of information systems often neglect this, resulting in systems that are suboptimal in use. So-called "information systems" are better thought of as information sources, which people interpret to inform their activities. If the perspectives of those doing the interpretation were also viewed as expert knowledge, the configuration of these information systems would be quite different.

Changes in access to what matters also change the distributions of recognized "knowledge" in an organization. Resistance to this needs to be understood. If an organization (e.g., a company) wants to benefit from the increased productivity that can be obtained by removing some barriers to access, it needs to be prepared to reconfigure its distribution of responsibility and status, associated with different groups being recognized as having knowledge. For example, in Whalen and Vinkhuyzen's (in press) example of service representatives, having call-service personnel recognized as being knowledgeable about machines would decrease the special status of engineers as the exclusive holders of knowledge about machines. In Suchman's (1998) example of document coding, if coders had greater access to the technical and strategic aspects of cases, this would decrease the special status of certified attorneys as the exclusive holders of this knowledge. Understanding knowledge in an organization requires analyses of the distribution of persons who differ in their positions regarding their recognized knowledge, according to the recognized knowledge categories of the organization, as well as their knowing and skillful participation that contributes essentially to the system's success although it is often unrecognized.

General Implications and Questions for More Effective Adult Learning

Although our evidence is predominantly from studies of work, it is clear that workers are in the habit of organizing much of their own learning in informal ways in the normal course of activity. It is reasonable to expect that if informal learning is so successful in formal institutions, it also functions significantly outside those institutions. There is a vast array of ethnographic research concerned with practices in many cultures, only a few of which (e.g., Beach 1995, Henze 1992) have been conducted or interpreted with a focus on learning. These studies are consistent with the general conclusions that we have discussed here. We offer some propositions and research questions regarding the three workshop topics that are implications of the framework that we have developed.

How Adults Learn a New Language

Like other practices, language is best learned in the context of the activities and communities of practice that matter most to the learner. Using language in ways appropriate to the community of

practice is crucial to participation, and participation in turn is crucial to learning language. The kind of English training often provided for individuals seeking U.S. citizenship supports learning to participate in very limited kinds of interaction that typically occur in school. This kind of language instruction is questionable for anyone, but it seems especially problematic for adults, whose social participation does not otherwise include school activity. In studies of work performance, Hull (1997) found that workers' use of language interacted with other aspects of their work, including technical understanding, social interaction, quantitative reasoning, and reasoning about administrative arrangements. Providing support for language learning in and for the settings in which speakers will be employing English is the clearest way to help speakers develop and control the linguistic strategies that they need and that will provide them with the opportunity to gain meaningful participation. In turn, the opportunity to participate meaningfully in an English speaking community that matters to the learner is the surest way to support English learning.

Learning a new language is a continuation of a person's linguistic development—an addition of a language to a repertoire rather than the development of an alternative to an "old" language. Much of an adult English learner's knowing, participating, and informing, are tied up with other languages, and building on them involves building a relationship between the languages rather than substituting one for the other. Each language and the practices that go with it can be a resource for the other. Many people's multiple communities involve non-English monolingual communities of practice, and bilingual (or multilingual) communities of practice, in which community practice involves complexly structured use of more than one language. Supporting people in building their bilingual or multilingual knowledge supports them in integrating the knowledge and practices of their lives, and provides continuity of identity and personal history (Grognet 1998).

How Adults Learn Basic Skills

The framework that we are developing requires rethinking what is meant by "basic." Access to what matters in a social system may be more basic than what people do when they take paper-and-pencil tests. The important issue of individuals' contributions and development is how successfully they can participate in the activities of their work and social lives. Successful participation depends interactively on the abilities of people and the resources that are available in the situation, including the social arrangements that set expectations and limits on what people can and should know and do. In evaluating the performance of individuals in a system, it is as important to assess the access that they have to what matters as it is to assess their individual skills. As an example, all the members of a work group may be included in the process of conducting reports, or that participation may be limited to a single individual in the group (Hull 1997). In another example, the members of a work group may be responsible for continuously monitoring and improving their own performance, or this participation may be limited to supervisors (Adler 1993).

This framework calls into question the assumption that skills need to be acquired in a linear progression in a sequence from simpler to more complex procedures. An alternative is to consider progression of learning in a community as a sequence from more peripheral aspects to more central aspects of the community's activities (Lave & Wenger 1991). In this kind of progression,

learning often occurs more as a succession of better approximations to more effective forms of activity, rather than as a succession of constructions of more complex procedures.

How Learning Changes as Adults Age

The framework that we are developing emphasizes the resources that are available to learners, as well as the learners' activity in learning. There is a major difference between the institutional resources for learning that are available to children and adults in our society. The schools provide children with a clear progression of advancement through the system with regular assessments of progress and promotion to more advanced levels. Institutions for adult learning are not organized into a system in which individuals can track their progress. Adult learners, therefore, need to construct the progressions of their learning from fragmentary resources (Hull 1998).

In this framework, similarities in the learning processes of adults and children are more salient than differences. Both children and adults learn by participating in activities, and their learning results in more effective participation to the extent that they have access to what matters in the social system. Learning through participation in a community includes developing an identity in that community and this development is related to and depends upon the person's identity in the other communities in which he or she is a member. Learning of the most significant kinds involves transformations of identity, which can be productive or destructive, depending on whether the transformations extend or damage other aspects of the person's identity that are involved in her or his significant participation in other communities. The ways in which children's and adults' learning differ are influenced by the ways that their identities have been developed and interact with the changes in identity that they must undergo for their learning to be successful in new environments, and it is essential to take these differences into account in the design of programs of adult learning. But for adults, as for children, research and program development are needed to understand and support productive forms of learning that extend, rather than damage, personal agency, responsibility, and growth in successful participation in work, families, and other social life.

References

Adler, P. S. (1993). The 'learning bureaucracy': New United Motor Manufacturing, Inc. *Research in Organizational Behavior, 45,* 111–194.

Adler, P. S., & Cole, R. E. (Spring 1993). Designed for learning: A tale of two auto plants. *Sloan Management Review,* 85–198.

Barley, S. R. (1996). Technicians in the workplace: Ethnographic evidence for bringing work into organization studies. *Administrative Science Quarterly, 41,* 404–441.

Beach, K. (1995). Activity as a mediator of sociocultural change and individual development: The case of schoolwork transition in Nepal. *Mind, Culture, and Activity, 2,* 285–302.

Bishop, L. (March 1998). Discussion held at the Institute for Research on Learning, Menlo Park, CA.

Boaler, J. (1997). *Experiencing school mathematics.* England: Open University Press.

Brown, A. L., & Kane, M. J. (1988). Preschool children can learn to transfer: Learning to learn and learning from example. *Cognitive Psychology, 20,* 493–523.

Cook, S. D. N., & Brown, J. S. (1995). *Bridging epistemologies: Critical challenges for organizational theorists.* Xerox Palo Alto Research Center, Palo Alto, CA.

Corcoran, E. (1993). Learning companies: Educating corporations about how people learn. *Scientific American* (February) 106–7.

Darrouzet, C., Gallegher, L., Harding, J., Linde, C., Lawrence, N., Moschkovich, J., Olson, L., Poirier, C., & Preston, C. (1996). *Enhancing life insurance sales through motivation and learning.* Institute for Research on Learning, Menlo Park, CA.

Eckert, P. (1989). *Jocks and burnouts*. New York: Teachers College Press.

Ehn, Pelle (1988). *Work-oriented design of computer artifacts*. Stockholm: Arbeitlivscentrum.

Grognet, A. (March 1998). Discussion held at the Institute for Research on Learning, Menlo Park, CA.

Henze (1992). *Informal teaching and learning: A study of everyday cognition in a Greek community.* Hillsdale, NJ: Lawrence Erlbaum Associates.

Hull, G. (1997). Manufacturing the new worker: Literate activities and working identities in a high-performance versus a traditionally organized workplace. In A. Lesgold, M. J. Feuer, & A. M. Black eds. *Transitions in work and learning: Implications for assessment* (89–135). Washington DC: National Academy Press.

Hull, G. (March 1998). Discussion held at the Institute for Research on Learning, Menlo Park, CA.

Hutchins, E. (1995). *Cognition in the wild.* Cambridge, MA: MIT Press.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation.* Cambridge, England: Cambridge University Press.

Orr, J. (1997). *Talking about machines: An ethnography of a modern job*. Ithaca and London: Cornell University Press.

Reder, S. & Schwab, J. (1988) The communicative economy of the workgroup: Multichannel genres of communication. In *Proceedings of the CSCW* ; ACM.

Sachs, P. (1995). Transforming work: Collaboration, learning, and design. *Communications of the ACM.* September.

Scribner, S. (1984). Studying working intelligence. In J. Lave & B. Rogoff eds., *Everyday Cognition: its development in social context*. Cambridge, Mass: Harvard University Press.

Scribner, S., & Sachs, P. (1990). A study of on-the-job training. Final report to the National Center on Education and Employment. Laboratory for Cognitive Studies of Work. New York: Graduate School and University Center of the City University of New York.

Scribner, S. & Sachs, P. (1991). *Knowledge acquisition at Work.* Technical Report #22, Institute on Education and the Economy, Columbia University.

Stein, S. (March 1998). Discussion held at the Institute for Research on Learning, Menlo Park, CA.

Suchman, L. (1995). Making work visible. *Communications of the ACM, 38,* 56–64.

Suchman, L. (February 1998). Discussion held at the Institute for Research on Learning, Menlo Park, CA.

Weisbord, Marvin (1987*) Productive workplaces: Organizing and managing for dignity, meaning, and community*. San Francisco: Jossey-Bass.

Wenger, E. (1998). *Communities of practice: Learning, meanings, and identity.* Cambridge, England: Cambridge University Press.

Whalen, J., & Vinkhuyzen, E. (in press). Expert systems in (inter)action: Diagnosing document machine problems over the telephone. In C. Heath, J. Hindmarsh, & P. Luff eds., *Workplace studies: Recovering work practice and informing systems design.* Cambridge, England: Cambridge University Press.

Whalen, M., & Whalen, J. (1997). *Integrated customer services: A learning case*. Institute for Research on Learning, Menlo Park, CA.